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INVENTION: NEAR VIDEO-ON-DEMAND SIGNAL RECEIVER

CERTIFIED TRANSLATION

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Dear Sir:

Yuka NAKAMURA residing at c/o SUGIURA PATENT OFFICE, 7th floor, Ikebukuro Park Bldg., 49-7, Minami Ikebukuro 2-chome, Toshima-ku, Tokyo, JAPAN, declares:

(1) that she knows well both the Japanese and English languages;

(2) that she translated Japanese Patent Application No. HEI 06-275936 from Japanese to English;

(3) that the attached English translation is a true and correct translation of the above-identified Japanese Application to the best of her knowledge and belief; and

(4) that all statements made of her own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements are made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 USC 1001, and that such false statements may jeopardize the validity of the application or any patent issuing thereon.

May 31, 2006 Yuka Nakamura
Date Yuka NAKAMURA

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[Title of the Invention] Program Reproducing Apparatus For Use With Near Video-On-Demand System

[Scope of Claims for a Patent]

[Claim 1]

A program reproducing apparatus for use with a new video-on-demand system for transmitting a plurality of the same programs at predetermined time intervals, comprising:

digital signal recording and reproducing means for recording data of top portions of the programs at predetermined positions of a tape and for reproducing the top portions from the tape;

memory means for simultaneously writing and reading data;

control means for causing said digital signal recording and reproducing means to reproduce the top portion of a selected program and said memory means to record the data following the top portion while the top portion is being reproduced and output the next data; and

image reproducing means for receiving data of the program selected by said control means and for reproducing the image of the selected program.

[Claim 2]

The program reproducing apparatus as set forth in claim 1, wherein said control means is adapted for causing said memory means to record part of the program from a first position at which a pause operation is started to a second position at which predetermined time elapses from the first position when a pause command is issued while the next data of the selected program is being reproduced, read the content from the first position to the second position stored in

said memory means after the pause operation is finished, write part of the program from a third position in the vicinity of the second position to a fourth position at which predetermine time elapses after the third position, and repeat the read operation and the write operation.

[Claim 3]

The program reproducing apparatus as set forth in claim 1, wherein said digital signal recording and reproducing means is adapted for recording preview data of the programs at predetermined positions of the tape and supplying reproduced preview data to said image reproducing means so that a user can select a program with reference to previews reproduced by said image reproducing means.

[Claim 4]

The program reproducing apparatus as set forth in claim 1, wherein said memory means is a hard disk drive.

[Claim 5]

The program reproducing apparatus as set forth in claim 1, wherein said digital signal recording and reproducing means and said memory means are adapted for storing selected program data in the format of received data.

[Claim 6]

The program reproducing apparatus as set forth in claim 1, wherein a time interval of the top portion recorded and reproduced by said digital signal recording and reproducing means is nearly equal to each of the time intervals of the programs that are transmitted.

[Detailed Description of the Invention]

[0001]

[Industrial Field of Utilization]

The present invention relates to a program reproducing apparatus for use with a CATV terminal of for example a near video-on-demand system (time interval

transmitting service).

[0002]

[Prior Art]

Conventionally, analog video/audio signals are transmitted from broadcasting stations. In recent years, as digital technologies advance, digital signals are transmitted from some broadcasting stations. In addition, with advancement of data compressing technologies such as MPEG, signals on around 10 channels can be transmitted with a transmission band on one existing analog channel.

[0003]

In digital CATV systems that employ data compressing technologies, a service called near video-on-demand that transmits programs at time intervals has been studied. In the near video-on-demand system, the same programs are transmitted at predetermined time intervals on a plurality of channels. Thus, the subscriber (user) of the system can see a desired movie with waiting time of at most the time interval.

[0004]

[Subject that the Invention is to solve]

In the near video-on-demand service, while the user is seeing a movie, he cannot temporarily stop seeing it. If he stops seeing the movie, he should see it from the beginning or look for the rest of the same movie from other channels.

[0005]

In the near video-on-demand service, after the user inputs a reproduction start command, he should wait for several minutes to see a desired movie.

[0006]

Therefore, an object of the present invention is to provide a program reproducing apparatus that allows the

user to temporarily stop reproducing a program that is transmitted at time intervals and see the rest of the movie after that.

[0007]

Another object of the present invention is to provide a program reproducing apparatus that can reproduce a program in a near video-on-demand service without waiting time.

[0008]

[Means for Solving the Problem]

The invention of claim 1 is a program reproducing apparatus for use with a new video-on-demand system for transmitting a plurality of the same programs at predetermined time intervals, comprising a digital signal recording and reproducing means for recording data of top portions of the programs at predetermined positions of a tape and for reproducing the top portions from the tape, a memory means for simultaneously writing and reading data, a control means for causing the digital signal recording and reproducing means to reproduce the top portion of a selected program and the memory means to record the data following the top portion while the top portion is being reproduced and output the next data, and an image reproducing means for receiving data of the program selected by the control means and for reproducing the image of the selected program.

[0009]

The invention of claim 2 is a program reproducing apparatus for use with a new video-on-demand system for transmitting a plurality of the same programs at predetermined time intervals, wherein the control means is adapted for causing the memory means to record part of the program from a first position at which a pause operation

is started to a second position at which predetermined time elapses from the first position when a pause command is issued while the next data of the selected program is being reproduced, read the content from the first position to the second position stored in said memory means after the pause operation is finished, write part of the program from a third position in the vicinity of the second position to a fourth position at which predetermine time elapses after the third position, and repeat the read operation and the write operation.

[0010]

[Operation]

After a pause command is issued until predetermined time elapses, program data is written to the memory means. When a pause cancel command is issued, the program data stored in the memory means is read. Thus, the user can see the rest of the program that was transmitted after the pause command was issued. While the program data is being read, the next data is searched and written to the memory means. These operations are repeated.

[0011]

Part of a program (data of a top portion) at a predetermined time interval to the existing program that the user is seeing is stored in the digital signal recording and reproducing device. When a reproduction start command is issued, the beginning portion of the program stored is read. Thus, the program can be reproduced without waiting time.

[0012]

[Embodiment]

Next, with reference to the accompanying drawings, an embodiment of the present invention will be described. Fig. 1 shows a construction of a terminal device for use

with a near video-on-demand system. Reference numeral 1 represents a tuner. The tuner 1 selects a desired channel of broadcast signals transmitted from a head end through a cable. For example, the transmission rate per channel is 24.5 Mbps or more. The same video information on seven channels compressed to a rate of 3.5 Mbps is transmitted. When the running time of a movie program is two hours, since (120 minutes ÷ 7 ≒ 17 minutes), the time intervals of channels are 17 minutes.

[0013]

A signal selected by the tuner 1 is demodulated by a demodulator 2. The demodulated signal is error-detected and error-corrected by an error correcting circuit 3. Thus, an error that takes place on the transmission path is corrected. The error-corrected signal is supplied to a demultiplexer 4. The demultiplexer 4 selects a desired one of a plurality of programs. To do that, control signals (signal paths of the control signals are denoted by dotted lines in Fig. 1) generated in a microcomputer 5 are supplied to the demultiplexer 4. Signals that pass through a man-machine interface such as a keyboard or a mouse are supplied to the microcomputer 5.

[0014]

An output signal selected by the demultiplexer 4 is supplied to one input terminal 7a of a switch circuit 6. A buffer 8 is connected to the switch circuit 6. An MPEG decoder 9 is connected to the buffer 8. It should be noted that compressing code other than MPEG can be used. Decoded data of the MPEG decoder 9 is supplied to the monitor through a base band process circuit (not shown). The monitor displays reproduced image data.

[0015]

The error-corrected data that is output from the

error correcting circuit 3 is supplied to program selectors 10 and 12 and selector controllers 11 and 13. The program selector 10 and the selector controller 11 select a program to be stored to a hard disk drive 14 that is a recording device. The selected program is supplied to an input terminal 17a of a switch circuit 16. An output signal of the microcomputer 9 is supplied to the selector controller 11. The selector controller 11 generates a control signal for selecting the program designated by the program selector 10.

[0016]

The hard disk drive 14 comprises a recording processor 18, a buffer 19, a head and disk 20, a buffer 21, a reproducing processor 22, and a controller 23. The recording processor 18 performs a write operation for the data selected by the program selector 16. The buffer 19 is connected to the recording processor 18. The head writes data received from the buffer 19 to the disk. The buffer 21 stores the data read from the disk. The reproducing processor 22 is connected to the buffer 21. The controller 23 controls the read/write operations. The microcomputer 5 supplies control signals to the controller 23. The operation of the hard disk drive 14 can be controlled by the microcomputer 5. The construction of the hard disk drive 14 can be the same as that of a conventional hard disk drive. For example, the storage capacity of the hard disk drive 14 is 446.25 MB.

[0017]

Read data that is output from the hard disk drive 14 is supplied to an input terminal 25a of the switch circuit 24. An output of the switch circuit 24 is supplied to an input of the switch circuit 6. As described above, the buffer 8 and the MPEG decoder 9 are connected to the switch circuit

6. Thus, the reproduced data of the hard disk drive 14 can be displayed on the monitor. The switch circuit 6 is controlled by the microcomputer 5 corresponding to a command such as a pause command that is input by the user.

[0018]

Reference numeral 15 (surrounded by dotted lines) represents a digital signal recording/reproducing device that is for example a digital VCR (video cassette tape recorder). The digital VCR 15 comprises a recording processor 26, a recording and reproducing selecting switch 27, a head and tape 28, a reproducing processor 29, and a mechanism controller 30. The recording processor performs a write operation for data selected by the program selector 12. Output data of the recording processor 26 is recorded to the tape through the head. Data reproduced from the tape is supplied to the reproducing processor 29. The mechanism controller 30 controls the recording/reproducing operations. The head and tape 28 is of helical scan type in which a magnetic tape is obliquely wound on a drum and the magnetic tape is scanned by a rotating head. Control signals that are output from the microcomputer 5 are supplied to the recording and reproducing selecting switch 27 and the controller 30. The operation of the digital VCR 15 is controlled by the microcomputer 5.

[0019]

The digital VCR 15 can record and reproduce digital data at for example 25 Mbps. As the magnetic tape, a cassette tape can be used. For example, a relatively small cassette tape can record digital data for 60 minutes at 25 Mbps. A reproduced signal that is output from the head and tape 28 is supplied to the reproducing processor 29 through the recording and reproducing selecting switch 27. The recording processor 26 performs error correction encoding

process, formatting process, digital modulating process, and so forth for the input digital signals (digital video signal, digital audio signal, and so forth). The reproducing processor 29 performs digital demodulating process, deformatting process, error correcting process, and so forth.

[0020]

The reproduced digital signals that are output from the digital VCR 15 are supplied to a program selector 31. A selection signal of the program selector 31 is supplied to an input terminal 17b of the switch circuit 16 and an input terminal 25b of the switch circuit 24. A control signal that is output from the microcomputer 5 is supplied to the program selector 31. The program selector 31 selects data of a top portion of a program for example a movie selected by the user.

[0021]

As shown in Fig. 2A, in the digital VCR 15, one cassette tape (recording time = 20 minutes) is divided into three regions L1, L2, and L3. In the first tape region L1 (recording time = 20 minutes), preview data and data of top portions of a plurality of programs are recorded. In the following example, as programs transmitted by the near video-on-demand system, movies are exemplified. However, the present invention can be applied to other video programs. In addition, in the following example, the number of movie titles is seven. However, this number is only an example.

[0022]

Fig. 2B shows a recording format of a top portion of preview data in the tape region L1. In a first region L11 of L1, preview data PRV1 to PRV7 of seven movie titles are recorded. In the other region L11, top portion data PRG1 to PRG7 of these movie titles are recorded. For example,

the recording time of the L11 region is 2 minutes 24 seconds and the recording time of the L12 region is 17 minutes. The preview data is demonstration data of snatches of the content of each movie. On the other hand, the top portion data is the content of each movie for first 17 minutes.

[0023]

The data rate of the preview data and top portion data is at for example 3.5 Mbps. On the other hand, the digital VCR 15 can record a digital signal at 25 Mbps. Thus, since 3.5 Mbps x 7 = 24.5 Mbps, preview data and top portion data for seven channels can be recorded on the tape. As shown in Fig. 2C, for example seven divided tracks are formed on the tape. On each divided track, record signals on seven channels (CH1 to CH7) are recorded. This format is referred to as multi-track format. In other words, on channel CH1, preview data PRV1 and top portion data PRG1 are recorded. On channel CH2, preview data PRV2 and top portion data PRG2 are recorded. In the same manner, preview data and top portion data are recorded.

[0024]

The remaining regions L2 and L3 of the cassette tape can be freely used as a large capacity buffer for the terminal system. For example, in these regions, a movie selected by the user can be recorded. The recording is preformed in the format of MPEG. Since (25 Mbps / 3.5 Mbps $\fallingdotseq$ 7.14), in the region of 20 minutes (L2 or L3), MPEG data for (20 minutes x 7.14 = 144.3 minutes = 2 hours 24 minutes) can be recorded. In reality, the rotation of the drum (rotating head) of the head and tape 28 and the tape speed are reduced to 1/7 of those of the standard mode (in which data is recorded at 25 Mbps).

[0025]

As another recording method for causing the VCR

15 to record data at 3.5 Mbps, the rotation of the drum is standard and the tap speed is 1/7 of the standard mode. In this case, data at 3.5 Mbps is converted into data at 25 Mbps by time base converting technique. The converted data is intermittently recorded on the tape in the ratio of seven to one. As another method, the tape speed and the rotation of the drum are same as those of the standard mode and the tape is intermittently travelled. The method for recording digital signals at lower rate than the standard data rate is referred to as flexible rate recording method.

[0026]

Next, with reference to Figs. 3 and 4, the operation of the embodiment of the present invention will be described. Fig. 3 is a flow chart showing an outline of the operation. At step 41, the system is in standby mode. In this embodiment, the digital VCR 15 records the preview data and the top portion data in the tape region L1. This recording operation is performed when the user does not use the system for example at night.

[0027]

At step 41, as a preparation, the user mounts a tape cassette to the digital VCR 15 and operates the man-machine interface (or a remote commander of the digital VCR 15) so as to use the near video-on-demand service. When the microcomputer 5 receives a signal corresponding to the operation of the man-machine interface, it supplies a control signal to the mechanism controller 30 and causes the digital VCR 15 to rewind the tape to the top position for standby.

[0028]

Thereafter, the preview data and top portion data on seven channels are supplied to the error correcting circuit 3 through the tuner 1 and the demodulator 2. The program selector 12 detects at what time the preview data

has been received corresponding to an output of the error correcting circuit 3 and supplies the detected information to the microcomputer 5. Thus, the microcomputer 5 sends control signals to the recording and reproducing selection switch 27 and the mechanism controller 30 by one to two seconds earlier than the time at which the preview data is transmitted.

[0029]

Thus, the mechanism controller 30 causes the head and tape 28 to record the preview data and the top portion data selected by the program selector 12 and received through the recording processor 26 and the recording and reproducing selection switch 27 to the first region L1 of the tape (at step 42). In Fig. 4, this recording operation is represented by REC1. After the preview data has been received, the program selector 12 sends the end information to the microcomputer 5. The microcomputer 5 sends a control signal to the mechanism controller 30. The mechanism controller 30 stops running the tape and immediately rewinds the tape to the top position (the beginning of the preview data) of the tape. This operation is represented by REW1 in Fig. 4.

[0030]

Thereafter, at step 43 of Fig. 3, the preview data is reproduced by the digital VCR 15. With the preview data, the user decides a movie he wants to see. A user command is supplied to the microcomputer 5 through the man-machine interface. Corresponding to the information, the microcomputer 5 sends a tape reproduction command to the mechanism controller 30. The reproduction operation is represented by PB1 in Fig. 4. After the digital VCR 15 has reproduced the preview data, the mechanism controller 30 stops running the tape.

[0031]

The preview data reproduced by the digital VCR 15 is supplied to the input terminal 25b of the switch circuit 24 through the recording and reproducing selecting switch 27, the reproducing processor 29, and the program selector 31. In addition, the preview data is supplied to the MPEG decoder 9 through the switch circuit 6 and the buffer 8. Thus, previews (running time is 2 minutes 24 seconds, each) of seven movies are reproduced on the screen of the monitor. In this case, seven previews are sequentially displayed on the monitor one after the other. However, seven previews may be displayed at divided portions on the monitor at the same time. With the previews, the user can decide a movie he wants to see. The display format of the previews can be controlled by the reproducing processor 29.

[0032]

With the previews, the user designates a movie he wants to see. For example, each movie is assigned an unique number. When the user designates the number corresponding to the movie he wants to see, the movie is designated. The movie (number) designated information is supplied to the microcomputer 5.

[0033]

At step 44, the user can see his selected movie. When the user selects a movie, the microcomputer 5 sends a control signal to the mechanism controller 30 so that it causes the digital VCR 15 to perform the reproducing operation. This reproducing operation is represented by PB2 in Fig. 4. In the reproducing operation, the top portion data is reproduced. The top portion data reproduced by the digital VCR 15 is supplied to the program selector 31. The program selector 31 selectively outputs only the top portion data of the movie selected by the user corresponding to the

control signal received from the microcomputer 5. When this reproducing operation is not performed, the program selector 31 does not perform the selecting process, but passes the data. After the top portion data has been reproduced, the VCR 15 stops.

[0034]

Since the VCR 15 has recorded the top portion of each movie, the user can quickly see a desired movie. Thus, the user can see a desired movie without waiting time using the near video-on-demand system.

[0035]

While the VCR 15 is reproducing the top portion data of the selected movie, the hard disc drive 14 starts writing the rest of the selected movie other than the top portion data. This operation is represented by dotted lines in Fig. 4. In other words, the data of the rest of the movie selected by the program selector 10 is detected. The data of the rest of the movie (received data) is supplied to the recording processor 18 through the input terminal 17a of the switch circuit 16. The data is supplied to the head and disk 20 through the buffer 19 and then recorded on the disk.

[0036]

The hard disk drive 14 simultaneously performs the write operation and the read operation. The read data of the hard disk drive 14 is supplied to the buffer 8 through the switch circuit 24 and the switch circuit 6. Thus, the user can see the rest of the top portion of the movie. While the user is seeing the movie, he can perform the pause operation.

[0037]

At step 45 in Fig. 3, it is determined whether or not a selected movie is reproduced from the beginning.

When the determined result is YES (reproduced from the beginning), flow advances to step 46. Thus, preview data is loaded from the VCR 15 to the hard disk drive 14. In this case, the switch circuit 16 selects the input terminal 17b. In Fig. 4, the tape is rewound up to the top position. This operation is represented by REW2. The preview data is reproduced and then stopped. This operation is represented by PB3. The preview data is supplied to the recording processor 18 of the hard disk drive 14 through the switch circuit 16. The hard disk drive 14 records the preview data to a predetermined position of the disk. The record position is defined by the controller 23 corresponding to a command supplied from the microcomputer 5.

[0038]

At step 45, when the determined result is NO (not reproduced from the beginning), flow advances to step 47. At step 47, the preview data recorded in the hard disk drive 14 is read and supplied to the buffer 8 through the switch circuits 24 and 6. Thus, the user can see the preview corresponding to the preview data reproduced by the hard disk drive 14. The user selects a desired movie with the previews. After step 47, the user sees the movie selected at step 44.

[0039]

Next, the pause operation according to the embodiment of the present invention will be described. When the user temporarily stops seeing a movie and then resuming it, he can see only the rest of the movie. This operation is referred to as the pause operation. The pause operation can be categorized as two cases. In the first case, while the digital VCR 15 is reproducing the top portion data, the pause operation is performed. In the second case, while data is being read from the hard disk drive 14 and the user

is seeing the movie corresponding to the data, the pause operation is performed.

[0040]

While the digital VCR 15 is reproducing data, when the user operates a pause command key, the pause command is sent to the microcomputer 5. The microcomputer 5 sends the pause command to the mechanism controller 30 of the digital VCR 15. The mechanism controller 30 causes the digital VCR 15 to pause.

[0041]

Next, with reference to Fig. 5, the pause operation in the case that the user is seeing the data that is read from the hard disk drive 14 will be described. Fig. 5A shows an example in the case that seven channels (channels 1 to 7) are used for one existing analog channel and a 120 minute movie program is transmitted at predetermined time intervals ($120 \div 7 \fallingdotseq 17$ minutes). Time sequences of seven channels are arranged on the same time axis. In Fig. 5A, "a" represents the top of the program and "b" represents the end of the program. As with the case shown in Fig. 2A, another movie is transmitted on one analog channel. On each channel, the same program is repeated twice. However, the drawing only shows part of long time (for example, one day). As an example, the top portion data recorded by the digital VCR 15 is top portion data for 17 minutes (positions a to c) of each of seven movie programs. The hard disk drive 14 has a storage capacity for recording data at the time intervals.

[0042]

When a reproduction request of a movie (transmitted as shown in Fig. 2A) selected by the user is issued at time t_0. As shown by an enlarged view in Fig. 2B, the digital VCR 15 reproduces the top portion data of

L12 of the region L1 of the tape. The program selector 31 selects the top portion of the selected movie. Thus, the user can see the top portion. While the user is seeing the top portion, the program selector 10 selects a channel (channel 3 in Fig. 2B) on which data following the position c is present. The hard disk drive 14 writes the data following the portion c (data for 17 minutes) to the disk.

[0043]

After the digital VCR 15 has reproduced the top portion, the position of the switch circuit 24 is changed. Thus, the read data of the hard disk drive 14 is supplied to the buffer 8 through the switch circuit 6. (In Fig. 2B, the time intervals of the write operation are represented by solid lines and the time intervals of the read operation are represented by dotted lines. Consequently, the user can see the data following the position c. Thereafter, the hard disk drive 14 simultaneously performs the write operation and the read operation. As a result, the user can see the movie corresponding to the read data.

[0044]

Next, the case that the user issues a pause command while he is seeing a selected program will be described. At time p_0, the user inputs the pause command. The user has seen the content (positions a to d) of the program at time p_0. When the pause command is input, the hard disk drive 14 starts recording the data of the program for 17 minutes from this time. If the pose interval exceeds 17 minutes, the hard disk drive 14 records the data for 17 minutes (positions d to e) and then stops recording it.

[0045]

At time xp_0 after predetermined time elapses, the user inputs a pause-off command. The pause-off command is sent to the microcomputer 5. The microcomputer 5 controls

the hard disk drive 14. The hard disk drive 14 reproduces the data for 17 minutes (positions d to e). The reproduced data is supplied from the hard disk drive 14 to the buffer 8 through the switch circuits 24 and 6. Thus, the user can see the rest of the program that was transmitted after the pose-on operation was performed (positions d to e).

[0046]

While the data is being read from the hard disk drive 14, data that is later than time xp_0 at which the pause-off operation was performed and closest thereto (namely, data for 17 minutes after position e) is searched and written to the hard disk drive 14. In the example shown in Fig. 2B, the region of (positions e to f) of the program on channel 5 is written to the hard disk drive 14. After the data of (positions d to e) is read, data of (positions e to f) is read. Thus, the hard disk drive 14 simultaneously performs read and write operations. In reality, the read operation and the write operation are performed by the buffers 19 and 21 of the hard disk drive 14 on time division basis.

[0047]

Thereafter, data is repeatedly written to and read from the hard disk drive 14. Thus, after the pause-off operation is performed, the user can see the program corresponding to the data read from the hard disk drive 14. The write operation and the read operation are repeated when the reproduction operation is stopped or until the end of the program. The positions (c, d, e, and so forth) of the program of the received data can be detected corresponding to time code or the like that synchronizes with the data of the program on each channel. Alternatively, with the difference between the time interval of each channel (in this example, 17 minutes) and the time interval after the

pause-on operation is performed until the pause-off operation is performed, the channel on which the next point takes place can be calculated. As another alternative method, when data after the pause-on operation is performed is stored, an overlap portion may be provided to some extent.

[0048]

When the time interval from the pause-on operation to the pause-off operation is 17 minutes or shorter, as with the positions (d to e), the hard disk drive 14 reads data for 17 minutes after the pause-on operation is performed. During this operation, when the pause-off command is issued, data is read from the hard disk drive 14. In addition, the hard disk drive 14 performs the write operation for the data on the same channel. After the data for 17 minutes has been written, the next data for 17 minutes is written. When the hard disk drive 12 has read the data of the region of (positions d to e), it reads the next data for 17 minutes. The write operation and the read operation are repeated. Thus, the user can see the reproduced data supplied from the hard disk drive 14.

[0049]

After the pause-on operation has been performed and then the pause-off operation has been performed within 17 minutes, if the pause operation is not performed, with only the received data on the same channel, the entire program can be reproduced. However, if the pause operation is performed at short intervals several times and the total of the pause intervals exceeds 17 minutes, data on another channel should be used.

[0050]

As is clear from the description of the operation of the embodiment according to the present invention, since the digital VCR 15 has recorded data of top portions of movies,

when the user issues a reproduction command corresponding to a selected movie, he can see the selected movie without waiting time.

[0051]

In the above-described embodiments, the hard disk drive is used as a memory. However, it should be noted that the memory is not limited to the hard disk drive. Instead, a semiconductor memory that can simultaneously read and write data, a writable optical disc, or the like can be used.

[0052]

[Effects of the Invention]

According to the present invention, when a near video-on-demand service is used, the reproduction of a selected one of a plurality of programs can be stopped in the middle and resumed from the rest of the program. In addition, after a reproduction start command is input, the user can see a desired program without waiting time.

[Brief Description of the Drawings]

[Fig. 1]

Block diagram showing a construction of an embodiment of the present invention.

[Fig. 2]

Schematic diagram for explaining data recorded by a digital VCR.

[Fig. 3]

Flow chart for explaining the embodiment of the present invention.

[Fig. 4]

Schematic diagram for explaining the operation of the embodiment of the present invention.

[Fig. 5]

Schematic diagram for explaining the operation of the embodiment of the present invention.

[Description of Reference Numerals]

4 Demultiplexer

5 Microcomputer

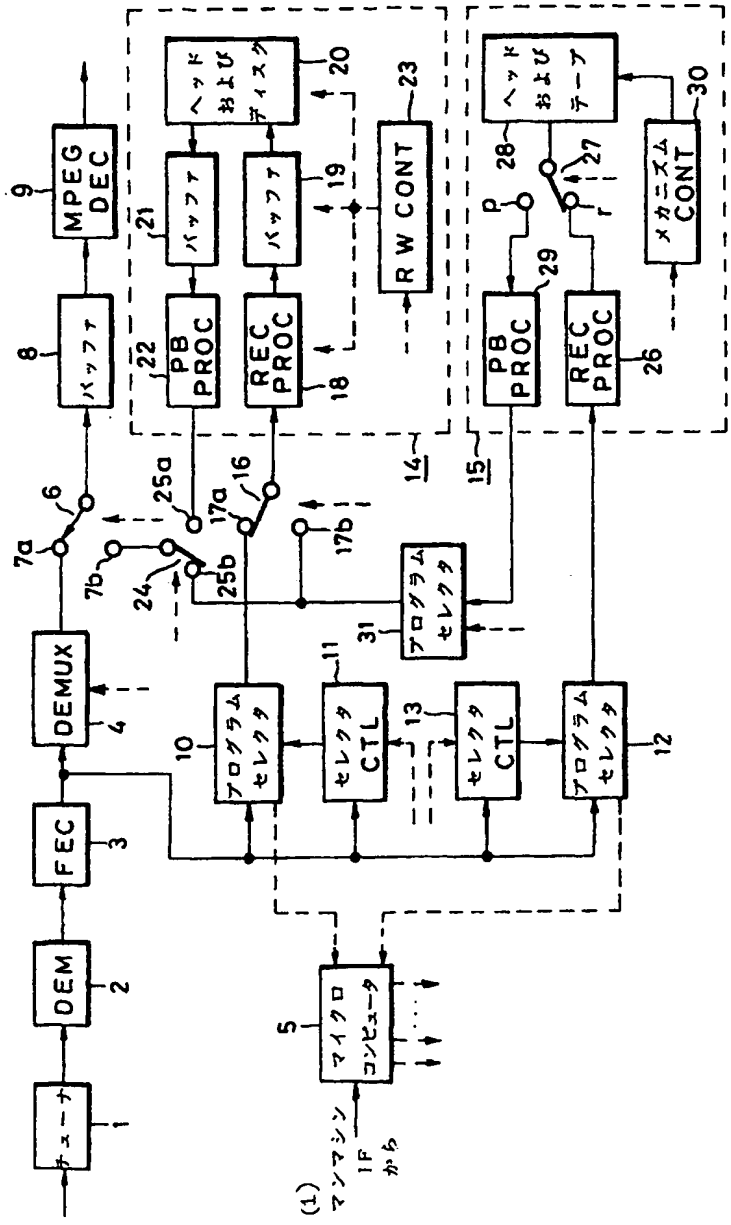
10, 12 Program selectors

14 Hard disk drive

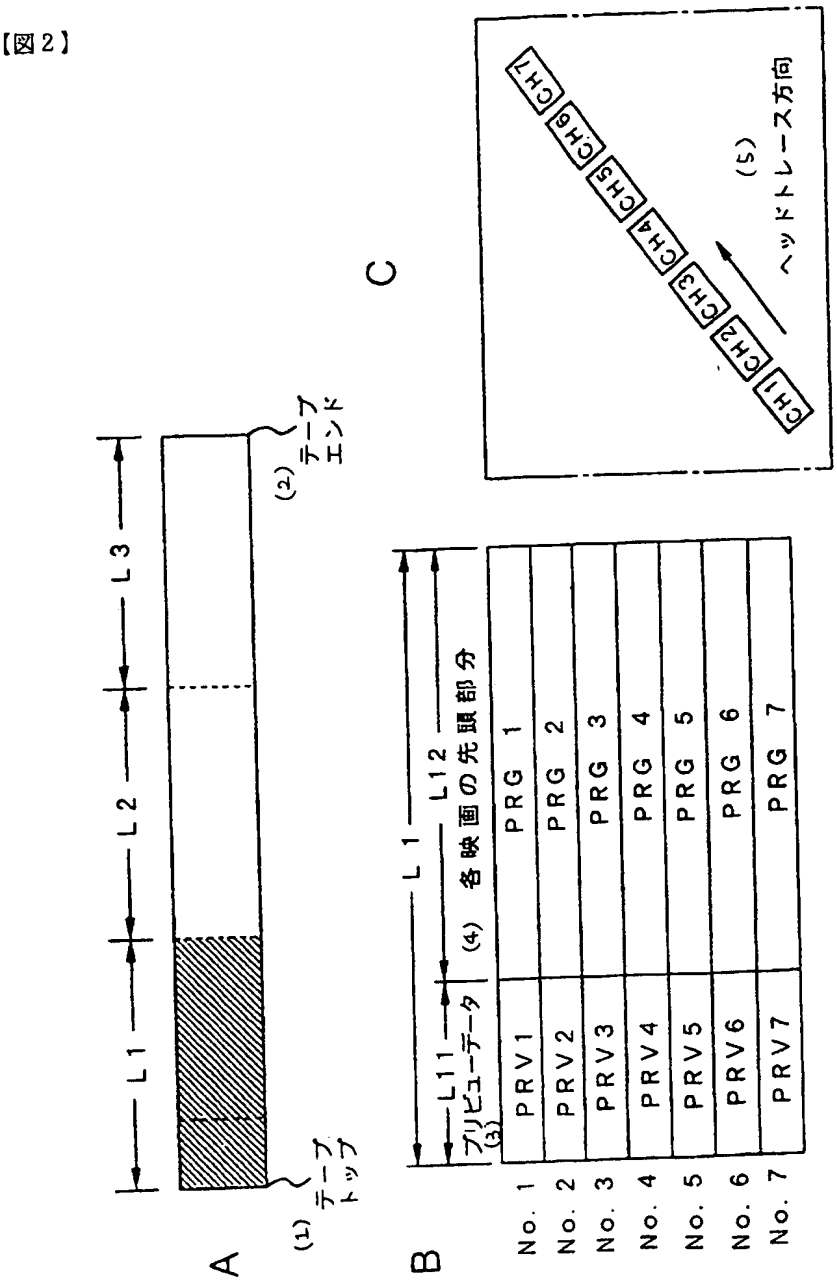
15 Digital VCR

【書類名】　　図面

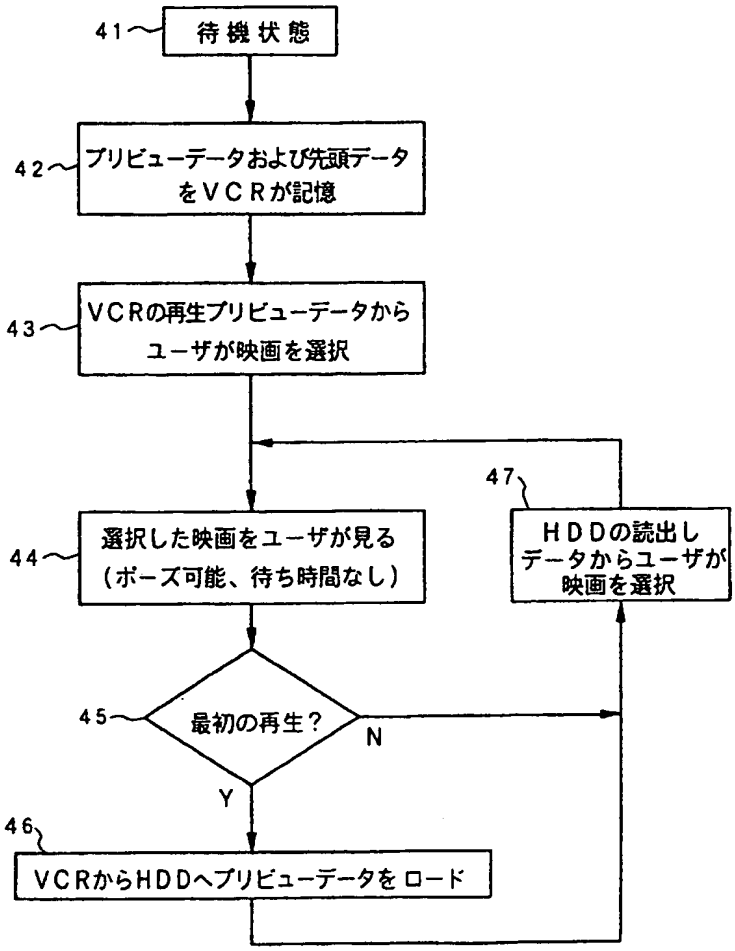
【図1】


チューナ
1
DEM
2
FEC
3
DEMUX
4
マイクロコンピュータ
5
(1)
マンマシンIFから
バッファ
8
MPEG DEC
9
プログラムセレクタ
10
セレクタCTL
11
プログラムセレクタ
12
セレクタCTL
13
R W CONT
14
15
PB PROC
16
REC PROC
18
バッファ
19
ヘッドおよびディスク
20
バッファ
21
PB PROC
22
23
ヘッドおよびテープ
メカニズムCONT
26
REC PROC
27
28
29
30
プログラムセレクタ
31
6
7a
7b
24
25a
25b
17a
17b

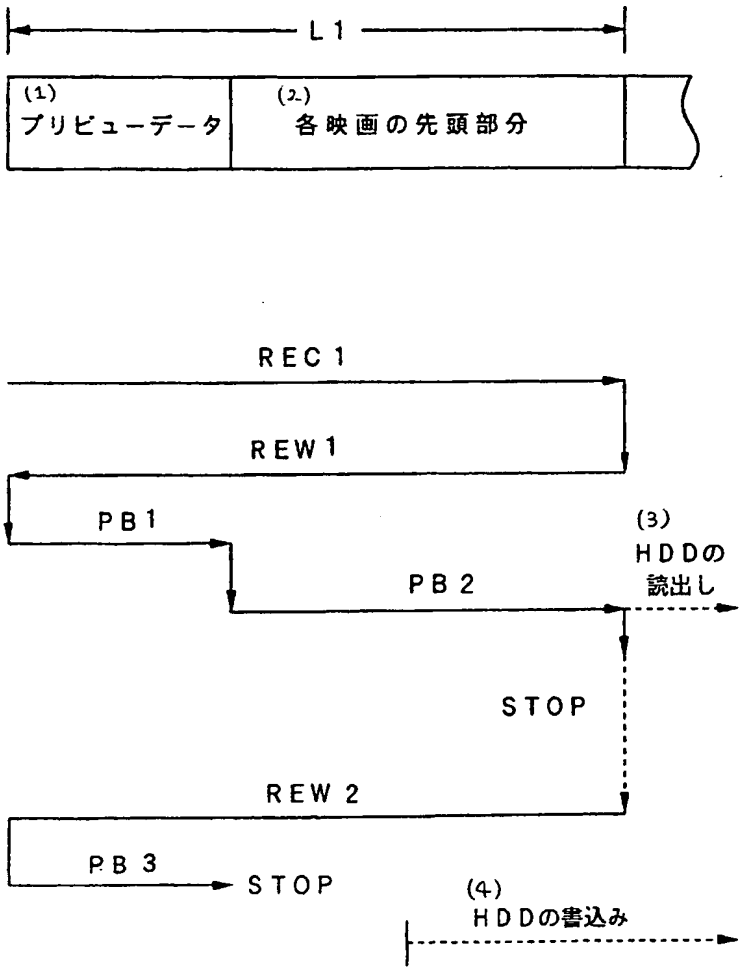
【図2】


A
L1
L2
L3
(1) テープトップ
(2) テープエンド
B
L1
L11
L12
(3) プリビューデータ
(4) 各映画の先頭部分
No. 1 PRV1 PRG 1
No. 2 PRV2 PRG 2
No. 3 PRV3 PRG 3
No. 4 PRV4 PRG 4
No. 5 PRV5 PRG 5
No. 6 PRV6 PRG 6
No. 7 PRV7 PRG 7
C
CH1
CH2
CH3
CH4
CH5
CH6
CH7
(5) ヘッドトレース方向

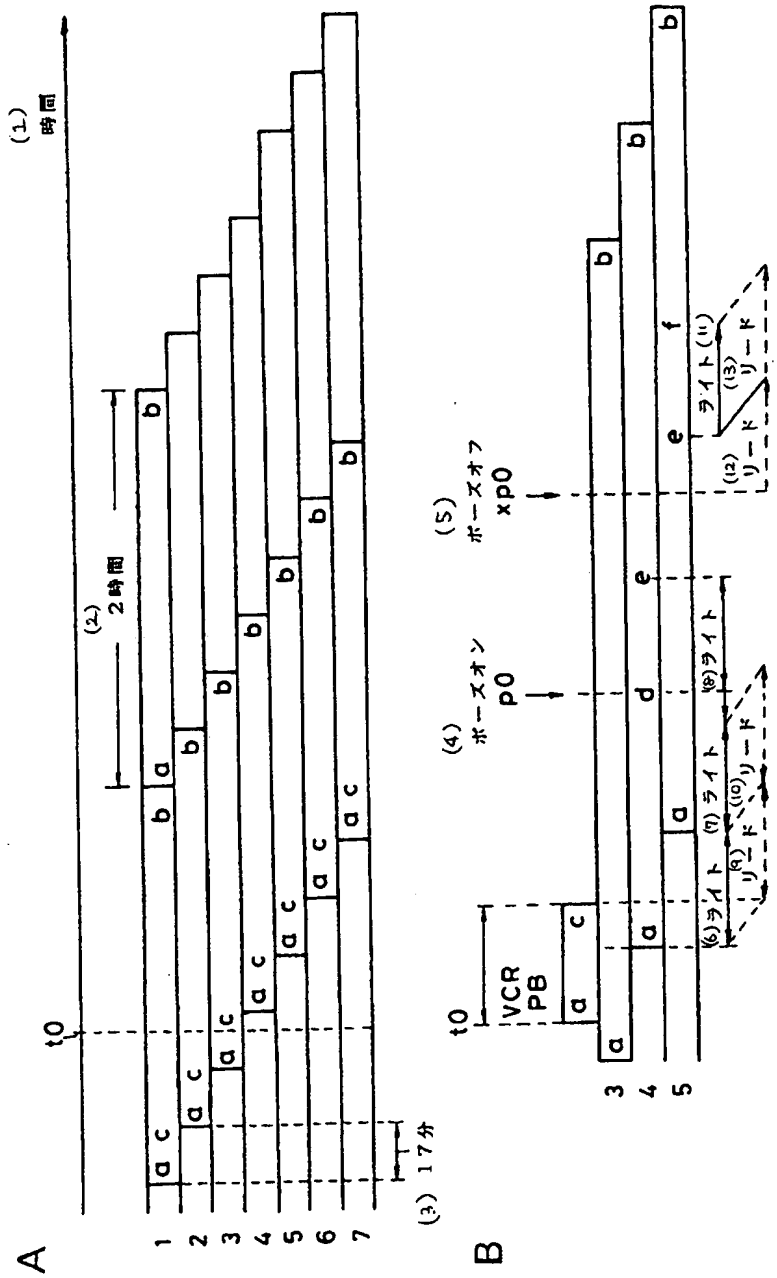
【図３】


41
待機状態
42
プリビューデータおよび先頭データをＶＣＲが記憶
43
ＶＣＲの再生プリビューデータからユーザが映画を選択
44
選択した映画をユーザが見る（ポーズ可能、待ち時間なし）
45
最初の再生？
N
Y
46
ＶＣＲからＨＤＤへプリビューデータをロード
47
ＨＤＤの読出しデータからユーザが映画を選択

【図4】


L1
(1)
プリビューデータ
(2)
各映画の先頭部分
REC 1
REW 1
PB 1
PB 2
(3)
HDDの
読出し
STOP
REW 2
PB 3
STOP
(4)
HDDの書込み

【図5】


A
B
(1) 時間
(2) 2時間
(3) 17ポ
(4) ポーズオン p0
(5) ポーズオフ xp0
t0
VCR PB
(6)ライト
(7) ライト
(8) リード
(9) リード
(10) リード
(11) ライト
(12) リード
(13) リード
1
2
3
4
5
6
7

[Title of Document] Drawings

[FIG. 1]

(1) ... FROM MAN-MACHINE INTERFACE

1 ... TUNER

5 ... MICROCOMPUTER

8 ... BUFFER

10 ... PROGRAM SELECTOR

11 ... SELECTOR CONTROLLER

13 ... SELECTOR CONTROLLER

12 ... PROGRAM SELECTOR

31 ... PROGRAM SELECTOR

21 ... BUFFER

19 ... BUFFER

20 ... HEAD AND DISK

28 ... HEAD AND DISK

30 ... MECHANISM CONTROLLER

[FIG. 2]

(1) ... TAPE TOP

(2) ... TAPE END

(3) ... PREVIEW DATA

(4) ... TOP PORTION OF EACH MOVIE

(5) ... HEAD TRACE DIRECTION

[FIG. 3]

41 ... STANDBY MODE

42 ... PREVIEW DATA AND TOP PORTION DATA ARE RECORDED BY VCR.

43 ... USER SELECTS A MOVIE FROM PREVIEW DATA REPRODUCED BY VCR.

44 ... USER SEES SELECTED MOVIE (PAUSE OPERATION CAN BE PERFORMED / WITHOUT WAITING TIME).

45 ... REPRODUCED FROM BEGINNING?

46 ... PREVIEW DATA IS LOADED FROM VCR TO HDD.

47 ... USER SELECTS A MOVIE FROM READ DATA OF HDD.

[FIG. 4]

(1) ... PREVIEW DATA

(2) ... TOP PORTION OF EACH MOVIE

(3) ... HDD PERFORMS READ OPERATION.

(4) ... HDD PERFORMS WRITE OPERATION.

[FIG. 5]

(1) ... TIME

(2) ... 2 HOURS

(3) ... 17 MINUTES

(4) ... PAUSE-ON

(5) ... PAUSE-OFF

(6) ... WRITE

(7) ... WRITE

(8) ... WRITE

(9) ... READ

(10) ... READ

(11) ... WRITE

(12) ... READ

(13) ... READ

[Title of Document] Abstract

[Abstract]

[Purpose]

To allow any selected one of a plurality of programs to be paused and a desired program to be reproduced without waiting time.

[Construction]

A hard disk drive 14 and a digital VCR 15 are provided. Top portions of a plurality of programs have been recorded by the VCR 15. When a selected program is reproduced, the top portion thereof is reproduced by the VCR 15. While the top portion is being reproduced, the rest of the received data is written to the drive 14. Thus, while the write operation is being performed, the read operation is performed. Received data after a pause-on operation until predetermined time is written to the drive 14. After a pause-off operation is performed, while the written data is being read, the rest of the data is written. Since the VCR 15 has recorded the data of the top portions of the programs, when a reproduction start command is issued, the data can be read without waiting time.

[Selected Drawing] Fig. 1

[Title of Document] Data Corrected Ex Officio
[Corrected Document] Application for Patent

〈Authorized Information・Added Information〉

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